A Survey of the Girsu (Telloh) Region

By

Prof. Thorkild Jacobsen
Harvard University

The "Survey of Central Sumer" undertaken by Vaughn Crawford, Fuad Safar, and the writer in 1953* succeeded in tracing the main lines of the rivers and canals which in ancient time supplied the rival citystates of Umma and Girsu with water. Umma was seen to lie on the Iturungal, a branch of the Euphrates which flowed over Adab (Bismayah) to Umma (Yokha) and then continued south and southwest over Bad-Tibira (Madinah) and over Larsa (Senkereh); Girsu, south-east of Umma depended on an affluent of the Iturungal which left from its left bank north of Umma, at ancient Zabalam (Bseikh) and continued down to Girsu (Telloh), from where an extension served Lagash (Al Hibba) and Nina (Zurghul).

In view of the special importance of these areas historically as the theater of the long drawn out and in many respects critical border wars between their capitals, Umma and Girsu it seemed desirable, however, to carry the mound survey here into rather more detail than had been possible in the short time available in 1953. An opportunity for such further work presented itself in 1969 when a sabbatical leave from Harvard University and a grant from the Guggenheim Foundation made it possible to return to the Telloh regions for some weeks of archaeological investigation.

The staff of our small expedition included my wife Katryna Hadley Jacobsen, Sayyid Jabir Khalil as representative of the Iraq Department of Antiquities, and our driver Jamil. We left Baghdad on February 15 in a rented Landrover and found convenient quarters in the Officials Club at Shatra. Here we were joined by the local representatives of the Antiquities service, Sayyid Saleh Mohammed and the guard of Tell Nasiriyah, Sayyid Haddad. Their help and untiring support proved invaluable in overcoming the hazards and frustrations of culitivation, irrigation ditches, flooding, and dust storms, which continually hampered our progress and sometimes kept us from our goal.

It is a pleasure here to thank also the many others who in generous measure helped us. Members of the Direct-

(*) See *Iraq* XXII (1960) p. 175 Note 1.

orate of Aniquities in Baghdad for interest and support, the German Archaeological Institute and its Director, Professor Schmidt for unstinted hospitality both in Baghdad and in Warka, and for many valuable suggestions. Professor Robert M. Adams of Chicago, for help with equipment, for advice and very particularly for generously making available to us important results of his own investigations in the area.

In planning our work, two points immediately suggested themselves, first a close look at the area between the Iturungal and the branch flowing down to Girsu in the hope of tracing there, in the pattern of distribution of Early Dynastic settlements, the line of the boundary canal of which the texts speak, and secondly a search in the areas north and east of the branch to Girsu for any traces of a feeder from the Tigris such as we know Entemena caused to be constructed. This feeder, and the drawing upon the copious Tigris supplies which it heralded were, we believe, a major factor in a spree of overirrigation and consequent salting up of the south which in Ur III times led to the economic and political collapse of Sumerian civilization. We shall consider these two points in order.

I. The Boundary Canal

A check of such mounds as we were able to reach in the area between the Iturungal and its Girsu branch showed a line of mounds of Early Dynastic date — in some cases continuing to Old Babylonian times — which could plausibly be interpreted as dependent on, and marking, the course of a canal taking off from the Girsu branch at Imrebi'a (no. 19) and flowing southwards and south-east for some 30 miles or more.

The mounds in question are numbered on the map as nos. (19), (22), (23), (24), (25), (26), (27), (28), (29), (30), (33), (34), (35), and (36). The interpretation of the line of mounds from no. (19), to no. (36) as marking a single canal flowing north-south, rather than as several southeasterly branchings from the Iturungal, is rather clearly indicated by the ancient texts, which speak of a single long canal marking the boundary between Umma and Lagash. The clearest statement is perhaps that of Entemena's Brick C (Sollberger, Corpus, Ent. 41) in which that ruler records his restoration of the E(g)-mah, the "Great canal dike", which marked the boundary fixed by the god Enlil and — as we know from other texts — measured out on the ground by Mesalim, between Umma and Girsu. This E(g)-mah Entemena "led out for (the god of Girsu) Nin-girsu from the Idnun to Mubi-kurra" ([Ent. 41 iii. 4-iv. 2] Nin-gír-su-ra Íd-nun-ta Mu-bé-kur-ra e-na-ta-è) a distance which is given in another text (ITT II 4410) as 5 double miles, less 16 nindan (5-da-na LÁ 16 nindan Mu-bé-kur-ra-ta gú Íd-nun-na-shè) or appr. 53 1/3 km., 34 1/8 miles. This agrees with the distance from Imrebi'a (19) on the Girsu branch of Iturungal to Madinah (no. 35), the next to the last settlement on the line and clearly the largest and most important one on its southern half.

If this line as here suggested may be identified with the boundary canal, we may seek the Idnun, from which it fed, in the canal leading to Girsu at its northern end, at Imrebi'a (19). Here too, at Imrebi'a (19) we may look also for the northern sanctuary of Nin-girsu, Antasurra and near it — in Imrebi'a itself or in a neighbouring mound — for ahe palace of Tirash. On the stretch of the line from Imrebi'a to Tell Nasiriyah (26) we should most likely locate the section of the border dike called Namnundakigarra, where Eannatum built sanctuaries for

various gods — perhaps best opposite Girsu at Anonymous (1) (no. 24). Here we may seek also the field Ugig where Entemena repulsed an attack from Umma, and the border section Lumma-Girnunta in the ditch of which the fleeing enemy's chariot teams bogged down.

At Tell Nasiriyah the line crosses, as mentioned, the watercourse traced by Professor Adams from airphotos. Since that watercourse takes off from the Iturungal it is clearly ancient, but since there are no settlements on its banks it is difficult to date it precisely. It may well have existed in Early Dynastic and earlier times, but it is also possible that it represents a new course of the Iturungal taken at the end of the Old-Babylonian period when it was no longer regulated and dredged. It flows, as mentioned, with no settlements along its bank and heads eastwards into the large area devoid of mounds which stretches up toward Girsu in the north, toward Lagash and Nina to the east, and is bordered in the west by the line of Tells with which we are dealing. To the south this empty area seems to continue down to the city of Nasiriyah and to the present course of the Euphrates. In it, as suggested on the accompanying map, we may assume there were fields liable to flood and actual marshes in antiquity. Marshes are found at present west and north-west of Al Hibba, ancient Lagash, and they are likely to have extended a good deal farther westwards in antiquity when the relatively modern Gharaf had not yet built up its natural levees. Here, accordingly, we must seek the "Marsh of Lagash" and the various "fields in the marshes" mentioned in the ancient texts. Correspondingly the border of these lowlying lands towards the higher ground to the north and west, marked by the line of mounds we are discussing was presumably the "bank of the desert" or "border of the Jezirah" (Gú-edinak) of the Ancients on which the more desirable fields coveted by both Lagash and Umma were situated.

II. The Tigris Feeder of Entemena

Entemena tells us in his Cone A and B that the ruler of Umma, Il, indulged in various unfriendly acts, one of which was to cut off Girsu's supply of water. The canals affected Entemena lists as "the boundary canal-dike of Ningirsu, the boundary canal-dike of Nanshe, Ningirsu's (canal lined with) clay-heaps in those of the border districts of Girsu that were over toward the Tigris, and the Namnundakigarra of Enlil, Enki, and Ninhursag" (ENT 28 iii 38-vi 10).

Of these the "boundary canal-dike of Ningirsu" and the "boundary canal-dike of Nanshe" may most naturally be identified with the upper and lower reaches of the canal suggested by the line of mounds from Imrebi'a (19) to Tell Abu Melekh (36). The stretch from Madinah (35) to Abu Melekh lies approximately opposite Nanshe's city Nina (Zurghul) and it is possible that the line once continued southwards beyond Abu Melekh: perhaps to Ijdaiwah east of the city of Nasiriyah, which has yielded remains of Early Dynastic and Old Babylonian times. In the upper reaches of this line — roughly opposite Girsu, we should probably seek also Namnundakigarra, which, as already indicated, would seem to have been a particular stretch on the boundary-canal hallowed by santuaries for major divinities. It may be because of this sacred character that it has been singled out and used to cap list of Il's offences. The canal serving the borders of Girsu toward the Tigris, can hardly be looked for elsewhere than north and north-east of Girsu. The course of the ancient Tigris is still to be ascertained

but it seems rather unlikely that it should have flowed very far from where it was in Islamic time, in the impressive bed called Shatt-al-Khadr, still clearly traceable on the ground. That like the Shatt-al-Khadr it came fairly close to Lagash (Al Hibba) and Nina (Zurghul) is suggested by its fairly frequent mention in economic texts relating to their land holdings. A canal serving the lands of Girsu towards this side, and not dependent on the Tigris, could only have been a branch-canal taking off from the left bank of the canal serving Girsu, which we tentatively identified above as the ancient Idnun, and flowing parallel to it through the lands on its left side.

All the canals mentioned as deprived of water by Il appear thus to have been affluents of the Idnun and dependent on it, and since the Idnun canal itself fed from the Iturungal above Zabalam it is well conceivable that Il could substantially have reduced the flow into the Idnun at its take-off point, to a point where he amount reaching the weirs of Girsu at Antasurra (Imrebi'a no. 19) would be barely enough for the needs of Girsu, Lagash, and Nina, and could not permit diversion to the boundary canal and to the assumed canal serving the border areas toward the Tigris.

That the supplies for the boundary-canal were stopped at the source, at its intake at Antasurra, is indicated by Il's reply to Entemena's remonstrances: "The boundary canal-dike of Ningirsu and the boundary canal-dike of Nanshe are mine' he said, 'From Antasurra to E-Dimgalabzu I will let the clay (-bottom) emerge in them 'he said'' (ENT 28, iv.24-38).

Entemena's countermeasure was the construction of a new feeder to supply the threatened boundary-canals and — one assumes — the canal of the border areas toward the Tigris. This new feeder he took from the Tigris, with which Il would not be able to interfere: "He constructed this canal from the Tigris to the Idnun, the bottom of the Namnundakigarra he built of stone and restored it (i.e. The Namnundakigarra) for his master who loves him, Ningirsu and his mistress who loves him, Nanshe" (ENT. 28, v. 9-18). In considering where this feeder may have run one will naturally assume that its take-off point at the Euphrates will have been higher, that is, further north, than the canals toward which it flowed, but also — for reasons of cost in construction and military control and defensibility, at the minimal distance needed for proper grading of the flow.

In the course of our survey we sought to investigate and date, therefore, any line of mounds descending from the north east upon the canal system of Girsu. One such tentative line can be seen just below Qal'at Sikar from Ishan Huwairah over Imam suweif to Tell Umm-al-Tuhavim and pointed approximately toward Sahib-az-Zaman. We tested this line at Umm-Tuhayim which we found to be Parthian-Sassanian in date. A second possible branch from Ishan Humairam south-southwest to Gharaf Yase due west of Refa'i and — crossing the ancient canal to Girsu (Idnun) at Jarudah — on to Tell Umm-al-Hassani, was tested at Tell Gharaf Yase and Tell Umm-al-Hassani, both of which proved to date from Parthian-Sassanian times. A third line may be seen as coming down from Tell-ad-Duhaimi over two anonymous mounds to Ishan-al-'Abid and Ishan Qubaibah pointing toward the ancient Girsu canal at Ishan Saidiyah. This line was investigated at Tell-ad-Duhaimi, at Ishan-al-'Abid, as well as at Ishan Qubaibah. All three again proved to be of Parthian-Sassanian date. A fourth and last line

can be drawn from Tell Krainisiyat just north-west of Tell ar-Rusafah to Tell ar-Rusafah, then south-west to Tubaj, on to Tell Abu Dhahab, Ishan-Chimbat-al-Huweish, and Imam Abu al-Mash, pointing toward the ancient Girsu canal, Idnun, at Muhallekiyah. This line proved to be composed of two stands. One, represented by Tell ar-Rusafah, Tubaj, Tell Abu Dhahab and Chimbat-al-Huweish, was clearly Islamic in date; the other, represented by Krainisiyat, possibly the lower strata in Chimbat-al-Huweish, and Imam Abu-al-Mash, proved older. Krainisiyat has surface remains dating from Obeid over Early Dynastic to Old Babylonian times; Chimbat-al-Huweish, a tiny mound almost devoid of pottery, yielded a baked brick measuring 32x32x7 cm. which conceivably is Old Babylonian; Imam Abu al-Mash, again, showed surface pottery of Early Dynastic date.

It is accordingly possible — but in view of the fair distances between some of these mounds not compelling — to reconstruct an ancient canal-course as connecting these settlements. If one assumes tentatively the existence of such a canal, its direction from close to the course of the Tigris in Islamic and very probably earlier periods toward Muhallekiyah on the ancient canal to Girsu suggests as further possibility that it might be that feeder from the Tigris of which Entemena tells us. That feeder, however, served not the Idnun to Girsu but the boundary-canal, joining the latter, one would surmise, at the section called Nammundakigarra since that was strengthened with stones by Entemena, presumably to withstand the expected scouring of the new Tigris supplies. For Nammundakigarra we have earlier suggested a location on the boundary-canal opposite Girsu at approximately Anonymous (1), so our tentative line from Krainisiyat must be continued from Muhallekiyah across the Idnun and over Anonymous (3) to Anonymous (1) in the boundary-canal. The distance from Muhallekiyah over Anonymous (3) to Anonymous (1) is between 11 and 12 miles on the map, so reconstructing a canal here would help to explain a statement in a text, ITT V 9 300, that the distance between Idmah (id-mah) — presumably the canal to which the dike E(g)-mah of the boundary line belonged — to the Idnun, presumably the ancient canal serving Girsu itself, was one double mile and 1470 nindan, that is, about 19 3/5 km. or 12 1/5 miles. This statement which is difficult to accomodate anywhere else fits very well — allowing for a few curves in the canal-course — if it were measured along the suggested Muhallekiyah-Anonymous (1) course of 11 to 12 miles, and may so, perhaps, be cited in favour of such reconstruction.

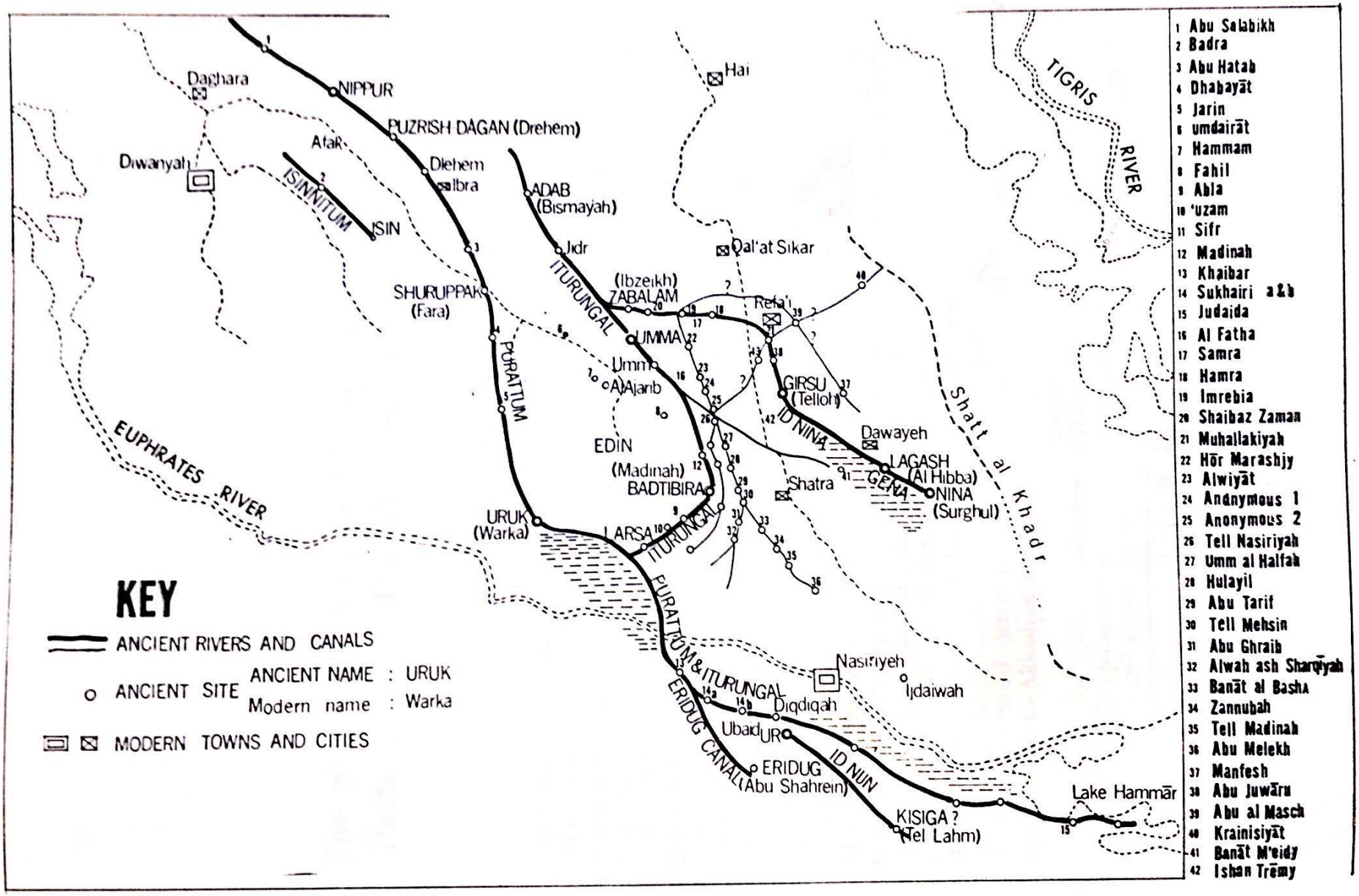
CONCLUSION

In conclusion it should be stressed that what we have attempted above is a preliminary report only. A great deal of textual data for the topography of the region could not be considered here, a great deal we have not yet been able to consult.

To these sources of uncertainty which can, perhaps, in some measure be remedied, come others inherent in the nature of the undertaking itself. Unlike the "Survey of Central Sumer", which sought to clarify basically the main lines of ancient occupation patterns only, this present survey has sought to apply the methods of Ceramic Surface Survey to details of topography in relatively small area. For such application

the inherent uncertanties of dating in the case of the occasionally scant, not too definite and clear-cut samples that some mounds produce, are in a measure mitigated by the possibility of evaluating the samples in the light of findings on other mounds belonging to the same line of occupation and — in the region here studied at least — by the existance of a long and clear break between the ancient occupation, which more or less ceased with the Old Babylonian period, and the later occupation, which resumed in Parthian-Sassanian times, and continued to Islamic times. Each of these major occupation-periods, Ancient, Parthian-Sassanian and Islamic, seems in fact to have its own area and does not significantly overlap with the others spatially.

More serious than the occasional dating problems are the difficulties of reconstructing canal-courses in detail in areas closely dotted with settlements. Here often various possible reconstruction patterns present themselves with equal claim to attention, serpentine-meander patterns of a single major stream, or herring-bone patterns of a major stream with minor affluents taking off from it on the bias, may both equally well fit a given set of data. In the case of the boundary-canal which we have here reconstructed as running southwards from Imrebi'a parallel to the Iturungal, variant reconstruction from our data in terms of a number of branch-canals flowing south-east from the Iturungal would also have been a possibility. Here other evidence — the information contained in inscriptional sources — have to decide, the texts speak of a single boundary-canal. What can be achieved, then, as one applies the method of Ceramic Surface Survey to details of topography as we have here tried to do, is less ultimate certainties that it is the providing of a new set of data, a new basis from which to attack the problem of the setting of Ancient History. By restricting ourself first to areas in which ancient mounds testify to ancient occupation one achieves a first constructive limitation. By separating out these areas further through dating their occupation and thus seeing what is alone relevant to each historical period, the constructive limitations yield still more clarity of focus. From that point on other evidence may advantageously be brought into play and can now be used with a degree of effectivity that would not have been possible had the results of the archaeological survey not been there as a guiding frame. Not one only, but all available fruitful methods, must be used if our knowledge of the past is to advance reliably.


Daghara
NIPPUR
PUZRISH DAGAN (Drehem)
Diwaniyah
Afar
Drehem
Ibra
ISINNITUM
ISIN
ADAB
(Bismayah)
Hai
TIGRIS RIVER
Jidr
Qal'at Sikar
(Ibzeikh)
ZABALAM
SHURUPPAK
(Fara)
ITURUNGAL
Refa'i
UMMA
Umm
Al Ajarib
PURATTUM
GIRSU
(Telloh)
Shatt al Khadr
ID NINA
Dawayeh
EUPHRATES RIVER
EDIN
(Madinah)
BADTIBIRA
LAGASH
(Al Hibba)
NINA
(Surghul)
Shatra
GENA
URUK
(Warka)
LARSA
ITURUNGAL
PURATTUM & ITURUNGAL
Nasiriyeh
Idaiwah
Diqdiqah
ERIDUG CANAL
Ubaid
UR
ID NUN
ERIDUG
(Abu Shahrein)
Lake Hammār
KISIGA ?
(Tel Lahm)
KEY
ANCIENT RIVERS AND CANALS
ANCIENT SITE
ANCIENT NAME : URUK
Modern name : Warka
MODERN TOWNS AND CITIES
1 Abu Salabikh
2 Badra
3 Abu Hatab
4 Dhabayāt
5 Jarin
6 umdairāt
7 Hammam
8 Fahil
9 Abla
10 'uzam
11 Sifr
12 Madinah
13 Khaibar
14 Sukhairi a&b
15 Judaida
16 Al Fatha
17 Samra
18 Hamra
19 Imrebia
20 Shaibaz Zaman
21 Muhallakiyah
22 Hōr Marashjy
23 Alwiyāt
24 Anonymous 1
25 Anonymous 2
26 Tell Nasiriyah
27 Umm al Halfah
28 Hulayil
29 Abu Tarif
30 Tell Mehsin
31 Abu Ghraib
32 Alwah ash Sharqiyah
33 Banāt al Basha
34 Zannubah
35 Tell Madinah
36 Abu Melekh
37 Manfesh
38 Abu Juwāru
39 Abu al Masch
40 Krainisiyāt
41 Banāt M'eidy
42 Ishan Trēmy

The Study of Ancient Mesopotamian Settlement Patterns And The Problem of Urban Origins[1]

By

Prof. Robert McC. Adams

There has never been any question that the main feature of the subsistance base on which early Mesopotamian civilization developed during the late fourth and early third millennium B.C. was irrigation agriculture. However, the extent and character of the early irrigation systems — and hence their effect on social and economic institutions — cannot be understood merely through the deductive application of generalizations derived from other parts of the world or from later periods when conditions were demonstrably different. Reliance on such generalizations has, in fact, led to the wide acceptance of a number of stereotypes which distort and obscure both the subsistence economy and the crucial determinants of change in Sumero-Akkadian society at large.

The evidence for early subsistence practices on the Mesopotamian alluvium is still very limited and largely indirect. The earliest pictographic writing provides illustrations of domesticated plants and animals, of main features of the agricultural technology such as the plow, and of other natural food resources such as fish, but the meaning and context of use of these symbols is seldom unambiguous (Falkenstein, 1936). By the middle of the third millennium there are scattered references to the construction of canals and to the sale of agricultural lands by corporate kin groupps and private individuals as well as much more numerous administrative records of temples and other manorial units engaged in agricultural production and redistribution (Diakonoff, 1954; Falkenstein, 1954). However, not until toward the end of the third millennium do the greatly expanded numbers and functions of texts written during the Third Dynasty of Ur permit an even partial description and localization of irrigation works constituting particular local systems (e.g. Sauren, 1966). Conditions by then were already far removed, particularly in social stability and complexity, from those which

(1) An earlier version of this paper was prepared for delivery at the Fourth Congress, International Economic History Association, in September 1968 in Bloomington, Indiana.

accompanied the initial growth of Mesopotamian civilization a thousand years earlier. Moreover, even for that period the available data — much of it still unstudied and unpublished — heavily emphasizes conditions around certain urban centers where important archives have been found, and hence fails to proivde a balanced regional picture.

Data on subsistence from archeological excavations is even less relevant and more fragmentary. The prevailing concern in late prehistoric and historic Mesopotamia has been with the recovery of texts, works of art, and monumental architecture. For this reason, and because of the relatively low ratio of scientific staff to the excavation labor force, little evidence has been recovered which bears on the problem. Analysis of soil samples for pollen, from which the changing spectrum of natural and domestic plant communities might be reconstructed, has barely begun. Quantitative studies of faunal remains also are still essentially absent, and for later periods even simple lists of identified species are extremely rare. Limited work has been done on the identification of plant impressions in chaff-tempered bricks and pottery. This has led to the suggestion that the substitution of six-row for two-row barley reflected the onset of irrigation in the alluvium (Helbaek, 1960), and contributed to the hypothesis that historic shifts in the wheat/barley ratio reflect soil salinity induced by over-irrigation (Jacobsen and Adams, 1958). But findings of this nature clearly fall far short of providing a basis for understanding the nature and role of irrigation within the larger subsistence system of which it was a part.

In these circumstances, considerable importance attaches to the changing patterns of ancient settlement that can be reconstructed from archeological surface reconnaissance. The land surface available for agricultural settlement at the beginning of the third millennium B.C. cannot yet be accurately delimited because of uncertainties as to geomorphic processes affecting the position of the head of the Arabian Gulf. It appears however, that the surviving ruins in perhaps two-thirds of it have been more or less systematically mapped and studied during recent years. Not only the historic core-areas of political dominance are represented in these surveys, but also some of the geographically more peripheral areas of the alluvium. Collections of ceramic "index fossils" in most cases permit determination of the sequence of occupation at individual sites, together with a fairly accurate assessment of maximum and terminal settlement size for each site and more speculative estimates of areas of occupation during earlier periods.

Surviving features of former irrigation systems also are a focus of study during these surveys. Only in rare cases can networks of canals that have been out of use for more than the last two thousand years or so be directly followed from air photographs and surface observations. River meanders of almost three times that age have been identified, however, and the major early watercourses can be approximately located from the position of adjoining sites and from the levees of sediment they gradually deposited. Moreover, discontinuities in the distribution of settlements at a given period roughly outline the limits of sedentary occupation. Analysis of the hierarchies of site sizes at different periods provides clues to changing population density, political organization, and underlying ecological instabilities.

As the foregoing implies, there has been substantial progress toward the objective of an essentially complete coverage of the pertinent areas. It must be

stressed, however, that there have been substantial differences in the character of the surveys themselves, so that all are not equally applicable to the problem at hand. In particular, there has been a rapid evolution in reconnaissance technique. More intensive studies, involving statistical manipulation of large, genuinely randomized sherd collections, now promise to open a new realm of information on what might be termed "functional differentiation" within and between sites. On the basis of experience both in Iraq and elsewhere, there is reason to believe that specialized craft quarters, centers or wards of administrative and upper-class residence, and regional or local differences in subsistence specialities all will be identified from surface remains in future work. In many cases, this will require renewed surveys and re-samplings of sites previously dated and mapped. Ideally, such re-surveys should be closely integrated with programs of selective soundings and large-scale clearance directed at the solution of specific research problems.

As originally pioneered by Thorkild Jacobsen, the application of systematic archeological surface reconnaissance to Mesopotamian conditions involved a primary concern for the major ancient watercourses. With limited time and resources available, complete coverage of large regions was not originally possible. Greatest attention was given instead to large sites of historical importance, with selective identification of smaller sites where they seemed to confirm the approximate courses followed by the large riverine arteries of antiquity. Only in this way was it possible quickly — if not always irrefutably — to establish the broad outlines of the historical geography of ancient Sumer (cf. Goetze, 1955; Jacobsen, 1958, 1960).

Shortly afterwards, the author and Vaughn Crawford undertook a survey of the northern part of the alluvium, a region roughly coterminous with the land of ancient Akkad. Some advance in technique was made possible by the availability of large-scale (1:50,000, Arabic Series) maps. Moreover, an attempt was made to visit and identify all early sites within the area surveyed. This made possible a clearer understanding of ancient settlement patterns as interacting *systems* of cities, towns and villages. It also brought to light some of the dynamics of change within the systems, arising both from natural fluctuations in the balance between different Euphrates channels and from human action.

In retrospect, there were a number of limitations to the approach then followed. First, the available maps proved to be of variable quality (particularly for unoccupied regions), and in any case tended to disclose only the larger and more prominent landmarks. Fairly detailed ground reconnaissance partly filled this gap, but could not provide the full information on ancient canal systems (and hence on suitable locations for ancient sites) that would have been (and now is) available only from air photographs. Then too, there were numerous minor — but cumulatively important — respects in which the dating criteria known and used at the time were too limited and imprecise for accurate assessment of some periods of occupation. Finally, the limitation of the Akkad Survey's coverage primarily to the Cassite and earlier periods represented a basic defect in approach. Not only are the settlement patterns of later periods an important research objective in themselves, but in addition the similarities and contrasts between widely different periods subsequently have proved to be a most significant source of insight. The area covered by the Akkad Survey, as well as areas included

in more recent surveys, is illustrated in Figure 1.

The next stage in the evolution of surface reconnaissance techniques was represented by the author's survey of the Diyala plains east of Baghdad, as part of the Diyala Basin Archaeological Project under the direction of Thorkild Jacobsen. Its results are now available in published form (Adams, 1965). A general discussion of the methods and limitations of earlier surveys also is available (ibid., Appendices A and B), although already rendered somewhat out-of-date by the rapid pace of recent refinements. Hence it may be sufficient here to note that an opportunity was found to correct the most salient defects of the work in Akkad that were referred to above. On the Diyala plains, and in all subsequent surveys, attention was devoted systematically to all periods of occupation; moreover, since then fundamental reliance has always been placed on aerial photographs. The improvement of chronological controls, of course, goes forward continuously. So also do the improvements in sampling methods and statistical interpretations that were mentioned earlier.

It should be stressed that there is no single, optimal or uniform, method of reconnaissance toward which all of these refinements are tending. Statistical manipulations, in particular, require greatly increased inputs of specialized time for sample collections and processing, thus reducing the area that can be surveyed with given resources in a given period. For certain problems, and as the total surveyed area begins to approach the total area available for settlement, this reduction in geographical scope may be of minor consequence or even irrelevant. For other purposes, particularly where one is concerned with establishing an interpretive framework that embraces an actual historic region rather than an arbitrarily delimited area, it may be more useful to sacrifice the precision and replicability of large, randomly sampled sherd collections for an admittedly more impressionistic coverage of the largest possible terrain. Given that these two choices are always at least partly in contradiction, the author generally has sought to expand the area of coverage. Others have not, and future trends almost certainly will lead increasingly in the direction of intensive studies of small areas. All that is essential is that the methods actually followed be consistent with the problem under investigation, and that they be explicitly described so that their significance for other problems can be independently evaluated.

Results of two survey campaigns by other scholars are highly pertinent to our theme but still await publication. One, conducted by Dr. Henry T. Wright in the environs of Ur, focussed especially on the relationship between Ur and its outlying dependencies at the beginning of the Early Dynastic period (Wright, 1967; in press). The other, by Dr. McGuire Gibson, advanced well beyond the older Akkad Survey data in an intensive study of the hinterlands of ancient Kish (Gibson, 1968). Both were accompanied by programs of small-scale soundings.

Two other recent surveys will serve to introduce the problems surrounding the initial formation of cities on the Mesopotamian plain. One was carried out in 1967 by the author and Dr. Hans J. Nissen in the region, centering on ancient Uruk, Larsa, Umma and Shuruppak, that is referred to in Figure 1 as the Warka Survey. The second, the Nuffar Survey, involved a relatively small region north and east of ancient Nippur and has just been completed at this writing. The Warka findings, on which only brief preliminary reports are

available in publication (Adams, 1968) provides a particularly useful, paradigmatic sequence of change in settlement patterns accompanying the beginnings of urban civilization.

More than a hundred small settlements lay on the plains around what must already have been a substantial shrine or temple center at Uruk by the middle of the fourth millennium B.C. They clustered in irregular groups in which lineal patterning is rarely evident and the empty areas outside of these clusters presumably represent large tracts of unsettled desert or swamp. The internal arrangement of sites within the clusters indicates that most communities were placed along braiding or anastomosing channels that are the natural regime of streams in floodplains, rather than suggesting axially branching, large scale canal systems. There are hints that individual groups of villages may represent some form of territorial unit, for often a cluster appears to be dominated by a single, somewhat larger site. Sites of the latter kind recall the little mud-walled sheikhs' qal'as of the Ottoman period, whose crumbling remains at once-strategic canal-offtakes or weirs still punctuate the desert horizon (Heinrich, 1950). But in any case the pattern of irrigation in the main was clearly a shifting, non-intensive one, relying on temporary check-dams, uncontrolled flooding, and very limited use of human- and animal-powered lifting machinery, rather than on heavily capitalized, expensively maintained, bureaucratically administered hydraulic works.

In the closing centuries of the fourth millennium the pattern of settlement was gradually transformed into a quite different one. Small villages remained the most numerous category, but their numbers and aggregate area declined as a new, intermediate class of towns appeared. Detached, relatively formless clusters began to give way to more elongated enclaves centering on linear series of these towns. This suggests a shift away from reliance on essentially natural watercourses, and in the direction of artificial canals that were diked, straightened, and maintained by man. One of these linear enclaves, appearing in a formerly unsettled area south of the later city of Umma in Jemdet Nasr times, may imply the construction of a canal about fifteen kilometers in length for which there was no natural precursor. But on the example of canals dug and maintained by corporate kin groups on their own initiative in the nineteenth and twentieth centuries, growing state intervention and bureaucratic management of hydraulic works were neither prerequisites for this process nor an immediate, necessary outcome of it.

At around 3000 B.C. Uruk underwent a phase of rapid growth, increasing several fold in population and reaching its maximal areal extent soon thereafter. It had become a true city by any reckoning, and now was girt for the first time with a massive enclosing wall. In its hinterlands the decline in smaller settlements quickened, leaving little doubt that the bulk of the urban population formerly had been rural cultivators for whom (or for whose ancestors) the town initially was less of a political capital than a focus of pilgrimages or regional religious observances.

Although attention is directed here primarily toward economic and demographic changes, it would be misleading to isolate such changes from other social trends. This massive shift in settlement patterns coincided with the emergence of contending local dynasties based in individual city-states — politically organized societies in contrast with the greater theocratic emphasis of earlier times. To some degree, urbanization may have been a conscious artifact of

royal policy as incipient dynasts strove to consolidate their powers. After all, the formation of large, walled population aggregates would have increased both the king's internal authority and the military effectiveness of the pollity he led. On the other hand, the formation of walled centers in an unsettled period would have attracted immigrants from the countryside even without a coherent plan of persuasion or compulsion. And of the increasing dangers that would have been felt in the countryside there can be little doubt. Both historic and archeological records clearly attest to the increasing emphasis on militarism that became characteristic of the area during the early centuries of the third millennium B.C. (Jacobsen, 1957).

Under these circumstances the pattern of settlement throughout southern Mesopotamia had become an essentially urban one by the mid-third millennium. Political relations above the city-state level remained highly unstable, with ephemeral conquests, submissions and alliances, but at any rate the great bulk of the population had taken up permanent residence within walled centers. Of course, these were cities of a kind now rarely encountered — sustained by the agricultural production in which by far the larger part of their own populations was primarily engaged. Fifteen kilometers appears to have been roughly the distance within which cultivation from an urban base was practical. Of the two score villages and towns which at an earlier period had been situated within fifteen kilometers of Uruk, for example, only two remained in the late Early Dynastic period. Beyond that limit regular cultivation presumably came to an end, areas that had been densely inhabited now forming a largely unoccupied buffer zone between hostile city-states. For reasons stemming not from natural conditions but from changes in human society, a new ecological niche had been created which invited only small groups of wary pastoralists.

There must have been corresponding changes within the cultivated radius around each city-state like Uruk. As distance to the fields and the threat of organized, large-scale hostilities became factors, there would have been an unprecedented emphasis on intensifying agricultural production in fields closer to (or even within) the walls. Multiple cropping, labor-intensive summer irrigation, specialized, high-yield gardens and orchards, and permanent hydraulic works all must have been more characteristic of the "green belts" around cities like Uruk than of any pre-urban phase of settlement. But it can also be established from contemporary administrative records that primary reliance continued to be placed — as in fact it still is today—on extensive cultivation under a rotational system involving alternate years in leguminous weed fallow.

As implied above, the concentration of the population in a relatively small number of cities must have occasioned some changes also in the canal system. Larger water storage facilities and more comprehensive irrigation both were necessary to sustain the cities. Both were facilitated by the increasing array of coercive means to draft corvee laborers that were at the disposal of the new political and military authorities who dominated the towns. The construction of city walls was one expression of these new powers to deploy labor, and royal claims to have dredged or opened new canals may be another. It is significant, however, that reference to canals in early royal inscriptions uniformly ignore their possible irrigation functions. Royal claims to have provided new arteries for ship-borne commerce hardly argue very strongly for the exercise of important

irrigation responsibilities by political authorities, and in any case more mundane administrative records make clear that state institutions played little part in the actual execution of economic and construction plans (Falkenstein, 1954: 797).

This is a necessarily much abbreviated account of the sequence of change around some of the most important city-states in southern Mesopotamia. Surveys around others disclose differences in detail; for example, the extent of urbanization, the timing of successive phases of urban growth, and the relative roles of theocratic and dynastic influence all are locally variable. North and east of Nippur, for example, recently collected (and still incompletely analyzed) field data suggests a widespread abandonment of the countryside in or soon after the late Uruk period. Although other interpretations are possible, this may imply that the most rapid phase of growth of urban centers in the vicinity of Nippur was significantly earlier than in the case of Warka. But in most basic respects the paradigm can be said to hold all the way from Sippar, virtually at the northwestern limit of alluvial settlement in early times, to Ur, not far above the swamps and brackish lagoons leading out into the Arabian Gulf.

One noteworthy discontinuity is that, as we turn northward from Sumer into Akkad, the early cities were generally smaller and more widely separated. A larger proportion of the population continued to reside in villaged and other outlying settlements until long after the period we are concerned with here. Small communities not only survived but even were newly founded as the main towns grew and consolidated their hold upon the countryside.

This difference is even more marked if we consider the Diyala plains, on the northeastern periphery of the Mesopotamian alluvium (Adams, 1965). In that area, the Early Dynastic period saw a vigorous expansion in the frontiers of settlement that had no parallel in Sumer. There was a correspondingly large increase in the number of small communities, without any of the more important centers increasing so much in size as to become more than a moderately large town. Here, then, the territorial unit at the time that the politically organized state made its first appearance seems to have been not a city surrounded by fields cultivated by its own populace, but instead a less centralized system of towns and outlying villages or other dependencies. Undoubtedly the smaller components were subservient to the larger to varying degrees, but at least the forces of attraction or compulsion were insufficient to draw most of the population within the walls of the central towns.

Attention should be drawn to how little we know of the numerous small settlements that remained characteristic of the northern part of the Mesopotamian plain until the late first millennium B.C. Usually they survive as low, inconspicuous, unnamed mounds, and it is to be regretted that in most cases they have attracted no greater interest among archeologists than among the passing Bedouin. Possibly it is enough to describe such settlements as villages, implying only that they form a class of relatively small population aggregates in comparison with towns and cities. On the other hand, there are hints that at least some of them were differentiated as to composition and function. The classical Sumerian Tempelwirtschaft would have been ill-adapted to a region in which most of the population was widely dispersed, and it is likely that the many smaller settlements were organized instead as corporate peasant (or even tribal) communities or as the

landed estates of local notables. I. M. Diakonoff has repeatedly pointed out that the predominance of the Tempelwirtschaft in Sumer itself usually has been far too uncritically assumed (Diakonoff, 1954); probably corporate communities and private estates coexisted alongside the Tempelwirtschaft in all parts of the alluvium as alternative variants in a complex continuum. Nevertheless, it seems likely that the role of the temple as a major land-owning and organizing institution in the agricultural economy was more attenuated in Akkad than in Sumer.

In any case, the suggestions of a partial contrast with Sumer in economic organization are not paralleled by basic differences in the irrigation regime. The lines of Early Dynastic sites on the Diyala plains trace out discontinuous, anastomosing networks of essentially natural watercourses like those in the south, again suggesting primary reliance on temprary weirs and small-scale canals that could be dug and maintained entirely on local initiative. What may have been absent in the Diyala area and Akkad was the somewhat more intensive development of lands immediately outside the larger towns. We may also speculate that the increased proportion of smaller settlements in the northern part of the alluvium reflects an adaptation based on a more nearly balanced mixture of farming and herding on the part of each localized, corporate group or adminstrative unit. In short, both agriculture and urbanism had become important, stable components of life for the bulk of the Sumerian population by the mid-third millennium. But in spite of a considerable (if fluctuating) degree of political, religious and economic integration with the south, the proportion of the population in the north that had accepted the same course was very much smaller.

The easternmost extension of the Mesopotamian alluvium, the land of Elam around the ancient city of Susa, was still a third regional variant. As a geographical transition zone, intersected by low, barren ridges and then broken off abruptly by the steeply rising flanks of the Zagros Mountains, one might expect this area to have more in common with the Diyala borderlands than with the heartland of suthern Sumer. However, the presence on at least the upper Elamite plains of adequate rainfall to permit dry farming, as well as of numerous, relatively small and manageable watercourses to encourage experimentation with small-scale irrigation techniques, led to a widespread and fairly dense population (even by modern standards) already by the end of the fifth millennium B.C. (Adams, 1962). The pattern of settlement at that time consisted largely of clusters of very small villages, possibly with a temple center at Susa corresponding to the center at Uruk and beginning to exercise some form of theocratic hegemony over the surrounding countryside. Subsequently, the same trend we have described at Uruk, the virtual disappearance of rural settlement and the corresponding growth of a major urban center, took place here also. Moreover, this development was not in any sense in retard of the comparable events around Uruk. In spite of its geographically marginal position, the urbanization of Elam may even have slightly preceeded the same trend in southern Sumer.

In Elam, unlike Sumer and Akkad, the historical records do not disclose a pattern of contentious rivalries between neighboring city-states. Susa seems to have maintained its local pre-eminence consistently, at least within the time periods to which written documents refer, although in struggles with more distant Sumerian countryparts the forces

of the city met with only varying success. As at Uruk, the growth of Susa as an urban center involved the abandonment of large areas of fertile, well-watered land that lay beyond the reach of cultivators who took up residence within its walls. In this case, however, the explanation that lands were abandoned in order to provide a buffer is made untenable by the absence of hostile neighbors. Presumably, then, urbanization in this case involved the concomitant appearance of new symbiotic relationships with nomads or semi-nomadic groups. Like the Bakhtiari tribe in the same area during recent times, pastoralists would have used the plains primarily for winter grazing and then moved into higher mountain valleys with the onset of spring. From the very extensive areas apparently devoid of other forms of land use, we might conclude that Elam preserved an unusual balance between sedentary urbanites and transhumant pastoralists as major, interacting components in its political structure. This brief review of conditions in different parts of the alluvium underlines the diversity of historical and ecological processes that were responsible for the earliest development of urban society. To say that irrigation agriculture was the most essential feature of the subsistence base throughout early lowland Mesopotamia does not provide a paradigm of related economic, demographic and environmental features that applies uniformly to all regions. The one common aspect of these regional variants is, in fact, in a sense a negative one: the scale of the irrigation works was small, the investment of labor and capital in them was low, and their requirements for bureaucratic, despotic management were essentially nonexistent. An explanation of the genesis of state society which focuses on large scale, "hydraulic" characteristics, like Wittfogel's account of what he calls "oriental despotism" (Wittfogel, 1957), accordingly offers neither an accurate characterization of at least early Mesopotamia nor an explanation of the relationship existing there between developing social institutions and ecological processes. Of course this does not deny, and in fact rather emphasizes, other contributions of irrigation to the growth of the Mesopatmian city-state. Especially included among these, as I have argued elsewhere (Adams, 1966), is the encouragement irrigation offers to processes of internal differentiation and social stratification, as well as to the growth of redistributive institutions.

An equally misleading stereotype involves the visualization of differing subsistence adaptations as polar contrasts. The hostile aspects of relations between nomads and settlers usually are stressed, for example, rather than the continuum of intergrading forms between these two ideal-typical constructs. This probably stems in part from the vivid biblical imagery connected with mutual antagonism of the desert and the sown. A more general, systematic statement of Bedouin life patterns as materially and ideologically "the negation and antithesis of civilization" entered historical scholarship with the great work of Ibn Khaldun (1967: 118).

With the view of nomads and peasants as opposite poles of a single axis of change goes a tendency to overstress the ethnic disjunction between the two groups. Pastoralists are regarded as external predators who generally become significant only in rare cyclical upheavals or in times of weakness, rather than as participants in a continuing process of interaction that shapes the societies of herdsman and farmer alike. This remains characteristic today of much that is written of Sumerians and Akkadians, in spite of the undoubted sedentism of

much of the Akkadian population and in spite of Jacobsen's demonstration of the interpretive pitfalls in such an approach (Jacobsen, 1939). The literate urbanite, whether an ancient chronicler or a contemporary historian or ethnographer, may derive some excuse for doing so from the need to impose whatever limits are most widely acknowledged upon his field of observation and analysis. It cannot be denied that the nomad-peasant contrast still provides the simplest and most general cognitive map held by peoples in the region, and of course this deep ideological distinction profoundly influences many realms of behavior.

On the other hand, the actual distribution of patterns of subsistence and settlement is better characterized as consisting of a variety of fluid, semi-sedentary adjustments (Bacon, 1954: 44-46). Lacking uniform, fixed qualities that would facilitate description, the importance of these semi-sedentary patterns has gone largely unrecognized. It lies precisely in their permitting wide, rapid, and remarkably subtle choices among alternative in order for human groups to survive in an environment that is diverse, unpredictable, and often harshly demanding.

The same tendency to limit and distort our perceptions of the patterns of interaction that are characteristic of the Mesopotamian landscape extends into another ecological niche, the marshes. Marsh Arab or Ma'dan villages frequently are cited not merely as examples of a technologically simple adaptation to condiions of riverine life but as fossilized societies that have preserved its original forms. One implicit, and highly questionable, assumption here is that the marshlands in question still essentially maintain their "pristine" condition as a habitat. Equally questionable is the assumption that a specialized, riverine-oriented pattern of land use has been the central, most durable feature of the Mesopotamian subsistence base, and that it can be regarded as an isolate.

Lower Mesopotamia today — and as far into the past as detailed, trustworthy itineraries, economic or administrative records, and similar documents take us — is not characterized by patterns of settlement in which the archipelagos of the Marsh Arabs play a dominant or even autonomous part. Instead, the characteristic that emerges most strikingly is the diversity of coexisting adaptations to the wide spectrum of conditions ranging between swamp and desert. Of course, special conditions have arisen in recent years as a result of state policies aimed at land registration, extension and improvement of the irrigation system, and an increasing emphasis on mechanization and market-oriented crops. But prior to the implementation of these policies, the sources are uniform in describing a mosaic of local groups that specialized in differing combinations of agricultural and pastoral pursuits, that exhibited great flux in degree of sedentism and place of residence, and that rarely respounded consistently or for long periods to a single line of urban or tribal authorities.

There is some evidenre that descriptions of this traditional mosaic by literate urbanites, and particularly by European travellers, often have seriously misrepresented its qualities as an adaptive system. The danger and discomfort that unquestionably were encountered by many visiting outsiders led to a gross overemphasis on the supposedly anarchic inconsistency and mutual hostility of intergroup relations. For similar reasons, there was a prevailing scepticism over the capacities of the indigenous system to provide rationally for its own long-term security, or to

respond to opportunities for economic growth. Since for the most part it has been based on impressions stemming from short periods of observation, this approach does not take sufficiently into account the wide fluctuations in productivity that until recently have been characteristic of the area. Flood, drouth, destructive silting up and oscillation in river and canal courses, salinization of prime agricultural land, crop blight and insect infestation — to say nothing of agencies more directly linked with human actions, all have been natural forces with which the agricultural regime has had to grapple continuously.

Even a highly successful adaptation under these circumstances will involve an apparent underutilization of resources in favourable years, and varying degrees of hardship for much of the population at other times. Moreover, fluidity and an apparent lack of structure in intergroup relations offer adaptive advantages that should not be ignored, principally, flexibility in pursuing alternative subsistence modes under adverse conditions, or in securing contingent support from a variety of related groups in differnet circumstances. Even the practice of retaining wealth in herds rather than accepting a permanent commitment to agriculture, often castigated as a rigidly traditional custom that is inconsistent with progress, is better understood in a more positive light. The maintenance and enlargement of herds surely was the investment alternative that was least subject to catastrophic, total loss under the conditions that obtained in the Mesopotamian alluvium until very recent times.

Briefly to summarize, this has been above all a plea for an empirically oriented program of further research on both ancient and modern irrigation, settlement, and subsistence practices in Mesopotamia. Enough is known to rebut some of the grandiose generalizations that too often are accepted as substitutes for a genuine understanding of the detailed, cause-and-effect interplay of ecological and social variables. Enough is known to indicate a very considerable degree of local vtriability in subsistence patterns, rather than a preoccupation with irrigation agriculture alone. Enough is known to indicate that responsibility for irrigation canal construction, maintenance and administration was retained primarily at the local level, so that the relationship between this activity and the growth of the state was loose and indirect at best. But these largely negative findings merely clear the way for new formulations that must be refined and tested by further research.

It may be assumed that the program of reconnaissance described above will go forward. Some lacunae in our present coverage are particularly in need of early and detailed coverage Among these, the area comprising the ancient realm of Lagash probably is most important of all. Indeed, it may seem to some that a 'complete'' survey of the Mesopotamian plain in accordance with reasonably modern standards is entirely sufficient as an objective. However, as one who has been engaged heavily in the task, I can only offer the contrary opinion that the attainment of this objective would produce no increment to knowledge that is commensurate with the very considerable further effort that is needed. Primary attention ought to be turned instead in two quite different directions. One is the refinement and extension of survey techniques that has already been referred to, seeking entirely unprecedented sources of information on the relationships between ancient villagers and city-dwellers from the physical remains that survive on the alluvial surface. The other involves attempting to overcome the inadequacies of the

wider intellectual context within which alone the findings of such surveys become relevant. What we are concerned with, after all, is not the abstract geometry of lines and circles on a map, as they shift over time, but with the interplay of natural and social forces that has shaped the course of historical development. To pursue this theme further, neither "complete" coverage nor endless refinements of survey techniques, nor enlarged excavation programs along traditional lines, nor a continuing preoccupation with little more than the political dimensions of history will be enough.

Let us consider the needs that can only be met by further field research. Crucial problems on which new data is necessary include year to year variations in agricultural output and their social consequences; factors contributing to local differences in productivity that might be conducive to the growth of social classes; and population density and distribution in relation to available agricultural resources. Looking beyond agriculture, more information is needed on the long-term dynamics of its interrelationships with pastoralism; on the varying fortunes and places of settlement of social groups which can be traced through time; and on the origins and stability of urban populations in the region. In many cases, generalizations with regard to these questions will be almost equally useful whether they are drawn from the present scene or the ancient past. Such themes are, of course, elementary where social and economic history have become well-developed disciplines. Fully conceding the limited, refractory nature of the evidence, it is time to develop methods and seek out data that will permit us to pursue them in ancient Oriental studies also.

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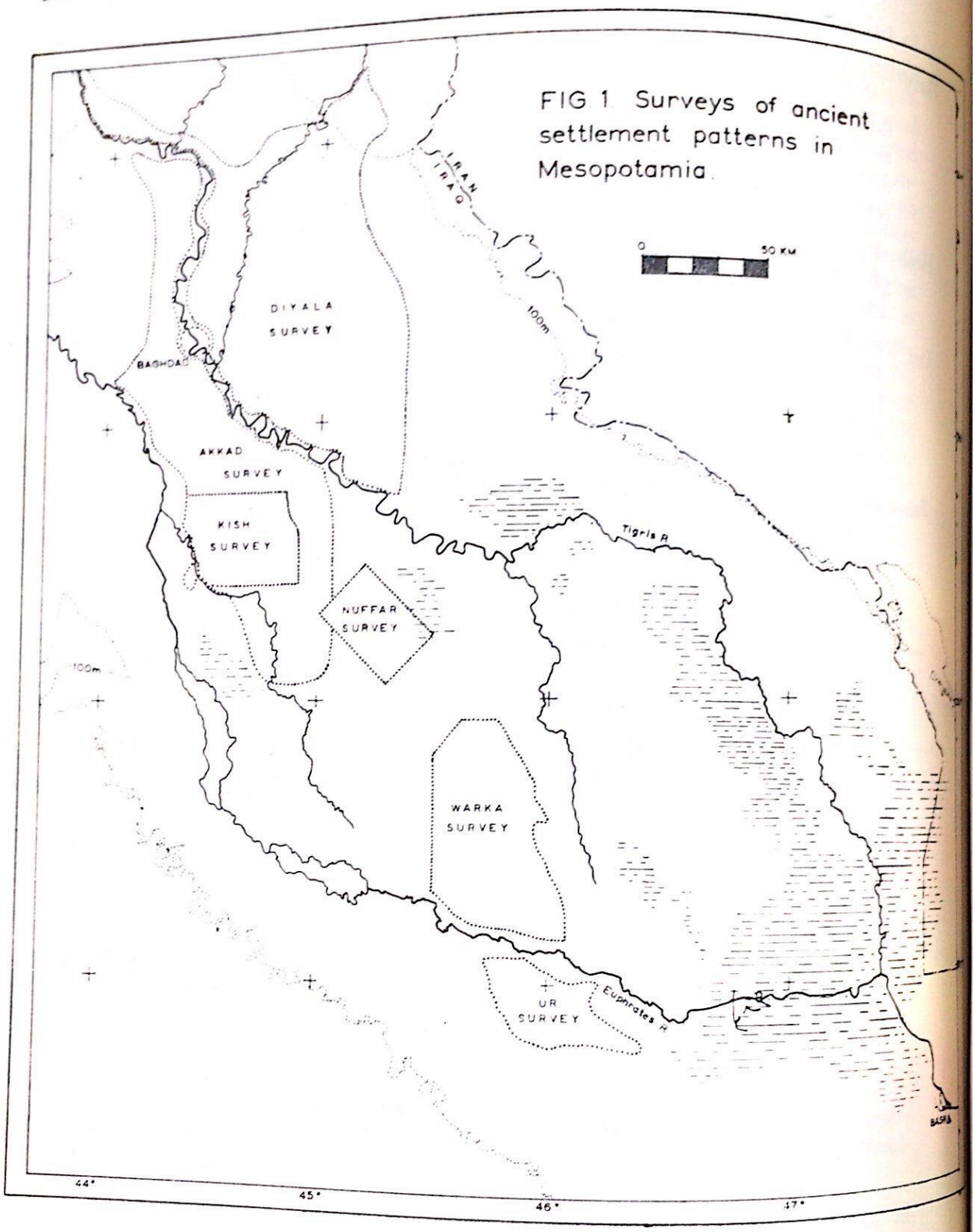

FIG 1 Surveys of ancient settlement patterns in Mesopotamia.

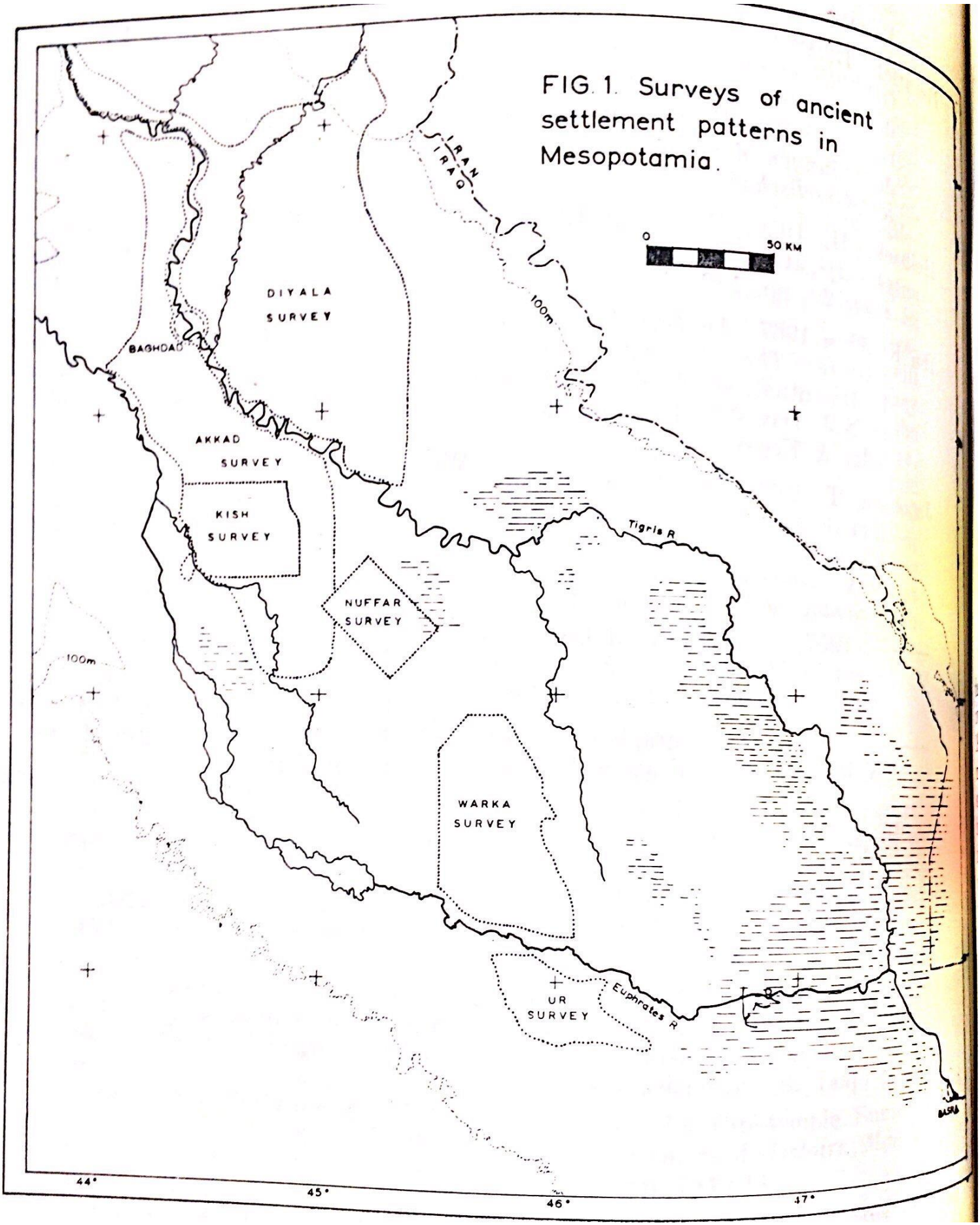

FIG. 1. Surveys of ancient settlement patterns in Mesopotamia.